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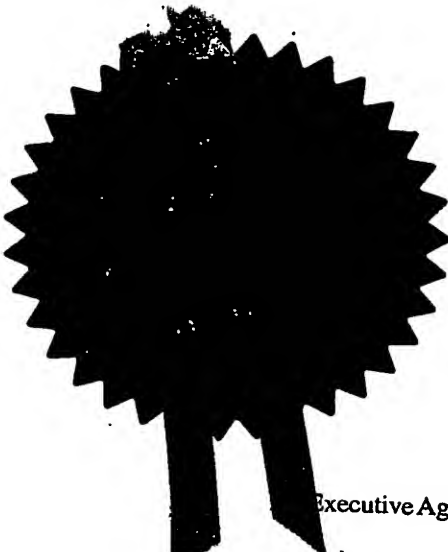
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The Patent Office

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### 1. Your reference

~~OBW/165 UK~~ OBW/165 UK.

### 2. Patent application number

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0300703.6

13 JAN 2003

### 3. Full name, address and postcode of the or of each applicant (underline all surnames)

Mr. OWEN BREWSTER WILKINSON

34, NEWBURGH ROAD, LONDON W3 6.D.Q  
Patents ADP number (if you know it) 589 2666 002

If the applicant is a corporate body, give the country/state of its incorporation

### 4. Title of the invention

OBUSPACIC SENSITIVE DEMONSTRATION Aid

### 5. Name of your agent (if you have one)

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

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### 6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country

Priority application number  
(if you know it)

Date of filing  
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### 7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing  
(day / month / year)

### 8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:

- a) any applicant named in part 3 is not an inventor, or
  - b) there is an inventor who is not named as an applicant, or
  - c) any named applicant is a corporate body.
- See note (d))

Patents Form 1/77

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Continuation sheets of this form

Description 2

Claim(s) 1

Abstract

Drawing(s) 2 + 2 *HK*

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Priority documents

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Statement of inventorship and right to grant of a patent (*Patents Form 7/77*)

Request for preliminary examination and search (*Patents Form 9/77*)

Request for substantive examination (*Patents Form 10/77*)

Any other documents  
(please specify)

11. I/We request the grant of a patent on the basis of this application.

Signature *[Signature]*

Date 18/01/03

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## **Orthopaedic Skeletal Demonstration Aid.**

The invention relates to orthopaedic skeletal demonstration aids.

In the medical field it is known to provide orthopaedic human skeletal bone demonstration aids specifically for the purpose of demonstrating surgical techniques on the human body.

Such a demonstration aid may consist of a facsimile human skeletal bone so as to be capable of demonstrating each stage of the surgical alteration made to the bone in the orthopaedic technique to be demonstrated, including the cutting of the bone and the fitting of the orthopaedic prosthesis thereto.

However in order to be able to mimic the natural kinematics of the bone its relationship to the main ligaments is difficult to produce. Furthermore the orthopaedic techniques have now evolved to work in conjunction with image guided surgical computer software, which deal with the kinematics of the replacement prosthesis of the bone in relation to the rest of the human anatomy.

It is an object of the invention to provide an improved orthopaedic human skeletal aid ligament balancing model which is particularly convenient in use.

According to the present invention there is provided an orthopaedic demonstration aid comprising a releasable clamp supporting a facsimile joint, preferably a ball and socket joint, consisting of two joint portions each of which has a shaft portion and a head portion, each shaft portion and associated head portion preferably comprising two separable components parts detachably connected together by a projection on one component part engaging within a receiving recess in the other component part, and the joint portions preferably being held together by facsimile ligaments.

In order that the invention may be more fully understood, reference will now be made, by way of example, to the accompanying drawings in which:

Figure 1 is a side view of an embodiment of the demonstration aid in accordance with the invention, in an assembled condition

Figure 2 is a ~~side~~ view of the embodiment of the demonstration aid in accordance with the invention, in a disconnected condition.

In the preferred embodiment of the present invention there is provided an orthopaedic human skeletal demonstration aid for demonstrating new imaged guided surgery techniques, along side the traditional techniques, allowing the demonstration aid to be used to illustrate both techniques, the aid comprising a facsimile ball and socket joint (2) that can be mounted onto a work surface by means of an integrated clamp (1). Attached to the ball section of the clamp is a facsimile section (4) which is anatomically correct in its orientation to the ball and socket joint, the section comprising two separable component parts each consisting of a respective one of the joint portions and respective portions of the shaft and canal and detachably connected together by a projection on one component part engaging within a recess in the other component part in such a manner

as to provide intercommunication between the canal portions within the two component parts. Located onto the projection is an eyelet (3) that keeps the facsimile ligament (9) captive in the correct anatomical orientation of the bone whilst allowing it to rotate freely.

Mounted further down the component (4) is an adjustable turnbuckle (5). Attached to the swaged end of the turnbuckle (6) is a facsimile ligament (9) that feeds through the eyelet (3) and then onto another bone component (7) and is attached into a final eyelet (8) located on the projection of the component (7) and is also in the correct anatomical position in relation to the bone. The facsimile ligament is attached to the turnbuckle via a swaged end (6) at one end and a feral at the other that locates into the eyelet (8). The ligament is made from a metal braid and is plastic coated for safety reasons.

In this example of the demonstration aid two adjustable ligaments are used, but other arrangements can be used if required.

The fact that the demonstration aid is formed in two parts means not only that if one part of the aid is destroyed during demonstration it can be replaced by a new part, but also that the material used to ligament the two joint portions is no longer required, as the portions (4) and (7) are used to hold the bones together with the adjustable ligaments (6 left) and (6 right) rather than normal methods of fixed rigid or elasticated cord that have previously been used to hold portions (10) and (11) together.

This will generally render the demonstration aid less costly to perform as it will be less costly to replace only part of the aid rather than the whole of the aid. From a manufacturing point of view, it is also easier to produce the components (10) and (11) with fixed facsimile ligaments.

A further enhancement of the aid is the use of the elasticated patella ligament and bone (12) that again locates onto the components, using eyelets (11) and (13) in the correct anatomical position on component (4) and eyelet (15) in the correct anatomical position on component (7).

A further enhancement to the aid is the use of a baseboard (16) that has slots (17) and (18) set in to fix the base of component (7).

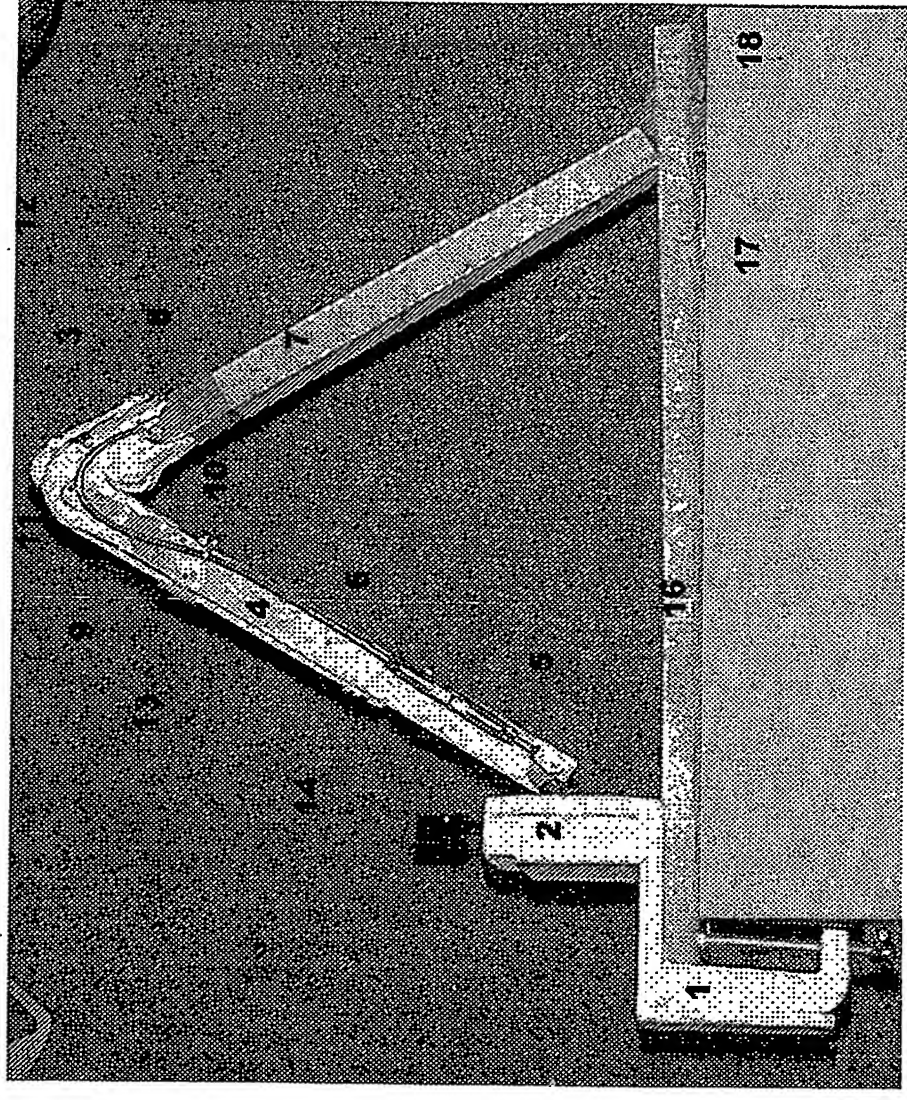
Figures 1 and 2 show an orthopaedic human skeletal demonstration aid in the form of a full skeletal leg. The demonstration aid is made in 9 parts and is capable of replicating the kinematics of the leg from the hip down to the base of the tibia. Each of the parts 4 and 7 connect with parts 11 and 10 respectively with a canal portion of substantially the same cross sectional diameter, and are held together as a friction fit with the required relative orientation about the longitudinal axis so as to produce a form of the complete bone that includes the correct kinematics in relation to the ball and socket joint to that of the parts 11 and 10.

To establish such a connection between parts 4 and 11 and 7 and 10 respectively a hole is created in parts 11 and 10 that opens out into the internal space of parts 4 and 11 when assembled together. Projections on the left and right hand side of part 4 and 11 are detachably receivable within part 11. Projections on part 7 are detachably receivable within part 10.

**Claims:**

- 1. An orthopaedic demonstration aid comprising a releasable clamp supporting a facsimile ball and socket joint consisting of two joint portions each of which has an elongate shaft portion and a head portion in the form of a facsimile human skeletal bone incorporating a ball or socket, each shaft portion and associated head portion comprising two separable components parts detachably connected together by a projection on one component part engaging within a receiving recess in the other component part, and the joint portions being held together by facsimile ligaments.**
- 2. An orthopaedic skeletal demonstration aid for demonstrating surgical orthopaedic techniques and new image guided surgical techniques using computers, the aid comprises a releasably lockable secure clamp being a facsimile of the hip ball and socket joint connected to two joint portions at opposite ends thereof and an elongate hollow shaft interconnecting the joint portions and having a canal extending therealong, wherein the facsimile human skeletal bone comprises two separable components parts each consisting of a respective one of the joints portions and respective portions of the shaft and canal and detachably connected together by a projection on one component part engaging within a receiving recess in the other component part in such a manner as to provide intercommunication between the canal portions within the two component parts, whilst the component parts are held together using facsimile co-lateral knee ligaments that are detachable independently adjustable flexible cable systems to allow for the components parts to be either tightened or loosened against each other.**
- 3. An aid according to Claim 2, wherein the two component parts are adapted to be connected together with a predetermined relative orientation about the longitudinal axis of the shaft.**
- 4. An aid according to Claim 2 or 3 wherein a facsimile patella ligament and bone are attachable to the aid if required, and a tibial patella portion of the ligament is made from a non-stretch material, whilst a femoral patella portion of the ligament is made from a stretch cord material.**
- 5. An aid according to any preceding claim wherein the facsimile ligaments are independent of one another and can be adjusted in length using flexible cable that is fabricated with a swaged connection at one end and a feral connection at the other end.**
- 6. An aid according to any preceding claim wherein the facsimile hip ball and socket joint is lockable to the table using an integrated clamping system, and the ball is lockable into any rotational position.**
- 7. An aid according to any preceding claim wherein the part that connects to the ball part of the ball and socket joint is connected by means of a releasably secure system that also creates the correct anatomical relationship with the attaching portion by means of a compound angle.**
- 8. An orthopaedic skeletal demonstration aid substantially as hereinbefore described with reference to the accompanying drawing.**

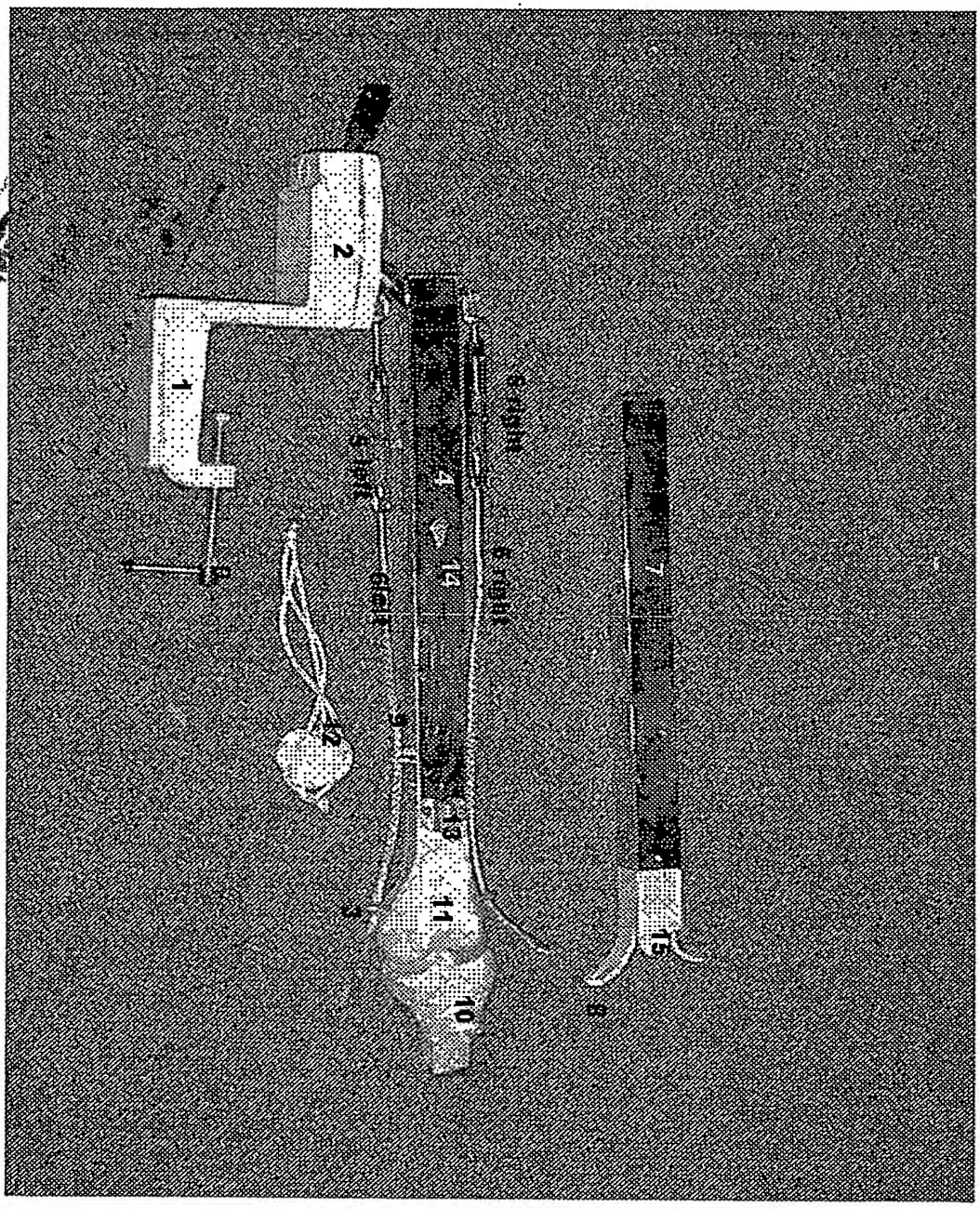
FIGURE 1 - Side View Assembled.



ORTHOPEDIC STRUCTURAL DEMONSTRATION Unit - 10/01/03.



FIGURE 2- DISASSEMBLED



ORTHOPEDIC SKELETAL DEMONSTRATION AID - 10/01/03.



THE PATENT OFFICE  
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